Accessible Gates Workshop
Interim Report April 2024

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Introduction:

The goal of these workshops is to design the next generation of gates or barriers that are more accessible to people with a mobility challenge[2] than those currently commercially available. This interim report outlines a number of possible technical routes, as well as the relevant design criteria for testing and evaluation. At this stage it is a set of ideas and mock ups. It is envisaged that the next report will describe the designs, testing and evaluation of a few real world prototypes. These improvements may also benefit many other users including family groups, and those with mobility issues but who do not need to use mobility aids.

We only consider gates that can be opened independently by a person with mobility challenges on a mobility device, and discount anything that requires assistance. One of the key insights to come out of the workshops is to approach the challenge in terms of a hierarchy of gate designs, ordered by the level of difficulty to open independently by a disabled person. In summary this hierarchy is:

1. Gap, or gate fixed open
2. Drive-through, ie a gate that opens as the user passes through (Section 2)
3. One-handed operation, ie a gate that requires just one hand to open it (Section 3)
4. Two-handed operation, ie a gate that requires two hands simultaneously to open it.

It is self-evident that a gap or gate fixed open is by far the easiest option for a disabled person on a mobility device. The way forward is through campaigning and convincing and does not fall within the scope of these design workshops. It would be excellent to see this simple and low cost solution adopted throughout the country and we support everyone's efforts in this area.

It is generally accepted that the 2-way easy-latch self-closing trombone handle gates[3] are the best option currently available on the market. However even this gate requires two hands to operate it: one to hold open the latch and the other to drive through. In a recent informal facebook survey even these gates could be opened easily by only 13% of respondents, 57% could open them only with difficulty, and 30% couldn't open them independently at all.

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2 The term 'disabled' is unsatisfactory for many reasons, but as it is in widespread and current usage it is used, in this report, interchangeably with the longer but more accurate phrase 'people with a mobility challenge'

3 eg https://centrewire.com/products/aston-2-way-gate/

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Where ideas or designs have originated from outside this workshop, we have referenced and attributed them as best we can.

There is a long-term dissatisfaction with the current set of commercial options on the part of people with mobility challenges. Steve Wilson's proposal that Disabled Ramblers (DR) should sponsor a prize for a better gate design was discussed during the DR's AGM in April 2023, and through discussion evolved into setting up a series of Workshops. These Workshops have subsequently gained momentum and are now an active collaboration between concerned groups and individuals:

- Disabled Ramblers [6]
- Natural England [7]
- independent Accessibility consultants
- Centrewire [8]
- Disability and Access Ambassador for the Countryside to the Minister for Disability [9]
- Brunel University Product Design Student Major Project [10]
- Southampton University Mechanical Engineering Student Group Design Project [11]

All parties participate on a voluntary / pro-bono basis, and all output is offered into the public domain. As such these workshops follow a model of knowledge-sharing and collaborative working. They are a testament to the open-mindedness and generosity of the individuals and organisations involved. The ideas expressed here are the shared understanding of the participants and not (necessarily) formal policy or positions of the respective organisations.

The Workshops are lead by Shail Patel, who before retiring due to disability was a Research Director at Unilever R&D. Most of the participants have experience of disabled rambling/walking with wheels, have a technical background, and/or are deeply involved with the field. We work hard to ensure that the voices, ideas and leadership by disabled people are at the heart of these Workshops.

Our aim is to work ourselves out of a 'job': at some point in the near future we will meet the challenge; reach the physical limit of what is possible to design in a gate or barrier; or reach the human limit of ideas, energy and enthusiasm. At this point the workshop will disband. In the short term we will run at least until the summer of 2024 and review our progress.

4 https://creativecommons.org/licenses/by-sa/4.0/legalcode.en
5 https://creativecommons.org/share-your-work/cclicenses/
6 https://disabledramblers.co.uk/
7 https://www.gov.uk/government/organisations/natural-england
8 https://centrewire.com/
9 https://www.debbienorth.org/post/disability-and-access-ambassador-for-the-countryside
10 https://www.brunel.ac.uk/study/undergraduate/product-design-engineering-bsc
11 https://www.southampton.ac.uk/courses/mechanical-engineering-degree-meng?tab-course=about

1. Criteria

Different types of public right-of-way (PROW) have different criteria. These are defined by the UK government as[12]:

- footpaths - for walking, running, mobility scooters or powered wheelchairs
- bridleways - for walking, horse riding, bicycles, mobility scooters or powered wheelchairs
- restricted byways - for any transport without a motor and mobility scooters or powered wheelchairs
- byways open to all traffic (BOAT) - for any kind of transport, including cars (but they're mainly used by walkers, cyclists and horse riders)

Clearly disabled people on mobility devices are free to use any public right of way. However in the first instance we will focus on footpaths as the issues are clearer in terms of walkers, runners and disabled users.

1.1. Independently operable

Gates and barriers can be classified into three types:

A) Independent: Gates, barriers, openings that may be easily accessed independently, eg the bump gate (cf Section 2.1)
B) With Help: Gates, barriers, openings accessible by a disabled person on a mobility device, but with help or some ability, eg Radar-key operated gates
C) Inaccessible: Gates, barriers, openings that are inaccessible, eg stiles

It is noticeable that since the Equality Act 2010, and with the dedicated campaigning of the purple pound group, many city centres are far more accessible to people on mobility devices. We begin to see disabled parking, disabled toilets, mobility devices available for hire or on loan, accessible shops, restaurants, cafés and so on. In consequence the number of disabled people on mobility devices independently going about their business in most shopping centres has greatly increased - as a random visit to a shopping mall will attest. This independent usage has not yet happened in the countryside. One can infer that this is because the countryside is not yet easily accessible.

Under the Equality Act 2010 access to the natural environment is protected as a "normal day-to-day activity" [13]. Let us take the example of a Radar-key operated kissing gate[14]. In many cases these are installed to exclude motorbikes, i.e. users who have no legal right to be present[18]. The net effect of such a gate is to prevent those disabled people who are simply unable to operate a Radar key in the cold, wet, windy circumstances typical of the outdoors.

It is true that many disabled people will be accompanied when on a ramble in the countryside, and that organised group outings have able-bodied helpers who may open the gate for them. However under the definition of disability in the Equality Act 2010, being "unable to travel unaccompanied" is specifically considered as a "substantial adverse effect", i.e. is a "protected characteristic"[15]. In our view therefore, any future gate should be designed to fall within

12 https://www.gov.uk/right-of-way-open-access-land/use-public-rights-of-way
13 https://www.gov.uk/government/publications/outdoors-for-all-fair-access-to-a-good-quality-natural-environment/
14 https://www.secure-a-field.co.uk/products/thornton-kissing-gate-with-radar-lock
15 https://www.gov.uk/government/publications/equality-act-guidance/disability-equality-act-2010-guidance-on-matters-to-be-taken-into-account-in-determining-questions-relating-to-the-definition-of-disability-html

category A, i.e. be independently operable. It would appear that a case might be made to prohibit the installation of gates in category B, as they discriminate against people with a protected characteristic, however the legal work required to establish this is beyond the remit of these Workshops.

1.2. Exclude livestock / openable accidentally by livestock

We recognise that under the Equality Act 2010 having livestock in a field is likely to be considered an "Objective Justification"[17] for installing a livestock proof gate, even if it's accessibility is not great. It is therefore important that we find a design option that excludes livestock. This is the main drawback with a simple opening, but a good argument to have gates fixed open when livestock are not present (cf 2.2, and BS5709:2018[16]).

1.3. Likelihood of acceptance by landowners

This is by definition critical as it is the landowners who make the buying decisions. However this may be influenced by what is commercially available, public opinion, and the Highway Authority which has responsibility for all rights of way.

1.4. Cost of gate

Cost will always be a key consideration, especially during this cost of living crisis and tightening budgets. That said the view from participants close to actual sales as that large and national customers are often more motivated to purchase something that worked and was fit for purpose. It is also worth noting that cost is not considered an "Objective Justification" under the Equality Act 2010[17]. This gives some hope that there is some wiggle room on cost particularly in the early stages of a new design. Gates on popular routes are sometimes financed by Local or Highway Authorities, or by user groups via donations.

1.5. Ease and cost of installation

As above this will always be a consideration. Many of the short-term design options around a latch that stays open once opened can potentially be retrofitted to current gates (cf Section 3). This has many obvious advantages. For the longer term challenges of a drive-through gate (cf Section 2) we recognise that these will require step change solutions that are unlikely to be retrofitted.

1.6. Ease and cost of maintenance

In many real-world situations the truth is that gates are often not well maintained. That said, maintenance requires significantly less effort then installing a new gate. The view expressed by participants involved with gate maintenance is that maintaining a gate can be done within an hour or so, but that the installation of a new gate may take up to one "person-day" of effort - depending on the gate. The degree of maintenance needed depends on the tolerance of the design. A typical problem is that timber posts will tend to lean in over time - this would be greatly mitigated by installing a steel frame underground that holds wooden posts in place. This system was developed during the Workshops but has not been tested yet.

16 https://www.gov.uk/government/publications/the-countryside-code/the-countryside-code-advice-for-land-managers
17 https://www.equalityhumanrights.com/en/advice-and-guidance/what-direct-and-indirect-discrimination

1.7. Exclude motorcycles

It is important to recognise that, apart from BOATs, motorcycles are not legally entitled to be on public rights of way, and that a legal case could potentially be made that this is a matter for law-enforcement and not gate design[18]. However in the real world the truth is that motorcycles can be a significant nuisance, and the perceived threat of motorcycles using a public right of way can be the motivating factor in the decision-making of landowners / local authorities when choosing a gate. If a solution can be found to this challenge it would be widely appreciated (cf 2.3).

1.8. Accessible to people with a variety of mobility challenges on a variety of mobility aids

There is a very wide range of different mobility scooters[19], powered wheelchairs[20], powered add-ons for manual wheelchairs[21], inclusive cycles[22], and many more bespoke and one-off designs. Some mobility aids are very wide, e.g. the Terrainhopper[23] at 85cm wide is right on the legal limit. Inclusive cycles may be significantly longer than other mobility aids. BS5709:2018[16,24] sets out best practice on gate design and installation. In addition, the new guidance outlined in Paths for All[25] are for gates of 1.1-1.5 m width to allow for a helper alongside. To a large extent this criterion will need to be tested on real world prototypes rather than paper and toy designs.

1.9. Accessible to people with children in prams

This is an important consideration, and indeed people pushing children in prams of very many different sizes and shapes face many of the same challenges as disabled users. However for our initial design phase this will not be a primary consideration. Once we have a design that works the understanding is that it should not be difficult to then ensure it is also accessible to people pushing prams.

18 *Garland & Salaman v Secretary of State for Environment, Food And Rural Affairs [2021], para 41 EWCA Civ 1098 (20 July 2021)*. 2021. [Online]. https://www.bailii.org/cgi-bin/format.cgi?doc=/ew/cases/EWCA/Civ/2021/1098.html&query=(CO/3695/2019)

19 https://www.motability.co.uk/find-a-vehicle/scooters/#search

20 https://www.motability.co.uk/find-a-vehicle/powered-wheelchairs/#search

21 https://www.healthcarepro.co.uk/mobility-aids/wheelchairs/power-add-ons

22 https://www.cyclinguk.org/article/cycling-guide/guide-to-adapted-cycles

23 https://www.terrainhopper.com/off-road-wheelchair/overlander-4zx/

24 http://www.beney.org/pittecroft/BS5709/5709.pdf

25 https://www.pathsforall.org.uk/resources/resource/outdoor-accessibility-guidance-download

2. Drive-Through

This involves the user wheeling up to a gate, and the gate simply opens. It is easy enough to envisage a very basic push-through design. Pressing a movable plate on the gate releases a latch or bolt (cf 2.1 below). The user then pushes the gate open as they wheel through, and the latch closes automatically when the gate shuts (automatically) behind. The challenge is to make a push through solution that is stock proof, and also prevents motorcycles. Outline solutions that involve electric power in some form or another are described below, however a mechanical solution is preferred as it would be cheaper and more robust. There are in general three main approaches:

a) True push-through or drive-through that has no other requirements on the user, such as the bump gate below (cf 2.1)
b) A device on the mobility aid: a gate that requires the user to have some item attached to their mobility device, eg a magnet, or potentially a wearable RFID fob or card. This would require no or minimal extra effort by the disabled person.
c) User-operated device: a gate that requires the user to carry and use a device, eg a walking stick or key. Clearly this option requires effort and dexterity on the part of the user. For many disabled people this class of gate, for example the Radar-key operated kissing gate[14], is impossible to open independently in real-world outdoor conditions. It is not in keeping with the principles of either "drive-through" or "one-handed operation" and therefore we do not prefer this route.

2.1. Bump & Drive and push-plate gates

This is a fascinating development from the University of Arkansas Agriability team[26]. The design is based on some earlier and now expired patents[27,28] from as far back as the 1950s. This wikipedia entry is interesting, not least for the image of a car from the 1950s[29]! The idea is similar to the push-plate above which you push into and then drive through the gate (Section 2). The examples show it on farms with a car or SUV, but there's no reason why a mobility device couldn't also trigger it. As this video shows gates of this kind can easily be opened by livestock[30] - note the underpinning article for the video is published under Creative Commons licence BY 4.0[31].

The claimed animal-proof (inc coyote!) attribute is, as far as we can tell, achieved either by a remote control and solenoid [32] which requires electrics, or a cattle grid [33]. However cattle grids on footpaths and bridleways are considered as an obstruction in the UK [34]. Powered wheelchairs with small wheels can get stuck on a cattle grid and equestrians are vehemently against them [35].

26 https://uofaagrabilityproject.weebly.com/bump-gate.html
27 US Patent US 2693653, published Nov. 9, 1954.
28 US Patent US 4475310A, published Sep 10 1984
29 https://en.wikipedia.org/wiki/Bump_gate
30 https://www.youtube.com/watch?v=DAAvnPFAEz0
31 McConnachie Emilie, Smid Anne Marieke C., Thompson Alexander J., Weary Daniel M., Gaworski Marek A. and von Keyserlingk Marina A. G.,2018, Cows are highly motivated to access a grooming substrate, Biol. Lett. 142018030320180303, http://doi.org/10.1098/rsbl.2018.0303
32 https://www.youtube.com/watch?v=aKcYcjKAS1E
33 https://bumpndrive.com/benefits-of-a-cattle-guard-how-it-works-with-a-bump-gate/
34 https://www.gov.uk/government/publications/common-land-guidance-sheet-10-highways-and-cattle-grids
35 https://www.bhs.org.uk › media › 5twpelvv › cattle-grids-1219.pdf

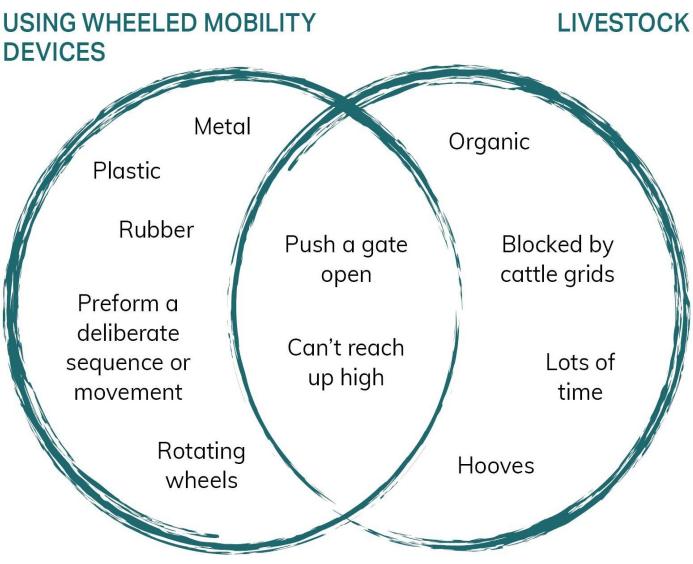
2.2. Livestock-proof push through gate

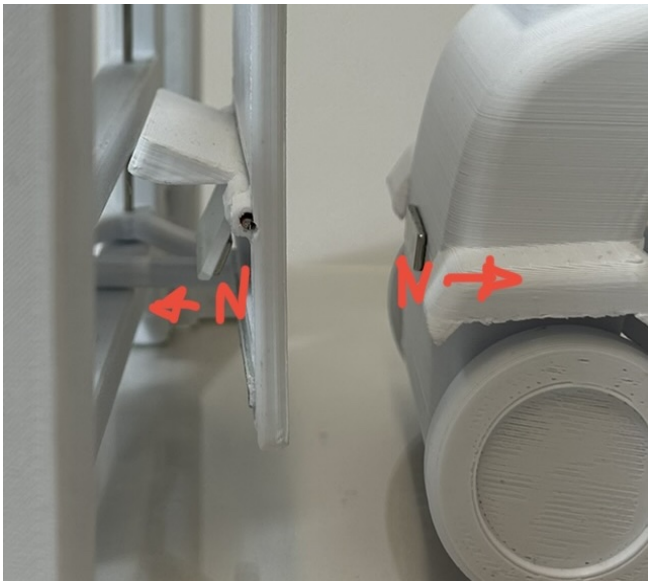
The challenge is to design a drive-through gate that prevents livestock and other animals getting through. We look first at what the differentiators are between livestock and mobility devices and how it might be possible to exclude the former but permit the latter. Some of these are outlined in the Venn diagram below. Arising from these differentiators are a number of technical routes.

The main focus has been on mechanical solutions that don't require electric power. These concepts are currently being investigated by a final-year undergraduate Product Design student at Brunel University as part of their major project.

The primary route being explored uses a push plate mechanism similar to the bump or push plate gates above (2.1). This is combined with a small blocker which stops the gate from being pushed open by livestock. The blocker and magnet are attached around a hinge. The magnet pivots the blocker out of the way when the wheeled mobility aid comes within range, allowing the user to push the gate open. This concept does require a magnet to be fixed to the front of the wheeled mobility aid which repels the magnet within the gate. This would be minimally invasive and could be easily retrofitted to the vehicle; alternatively, for some users, a magnet affixed to a stick would also work. This concept is compatible with the easy latch. Additionally, using one magnet and one piece of magnetic metal may be explored. This would benefit from reduced risk of magnet-related safety concerns but may allow for it to be opened more easily by accident. At present further development is needed into scaling up the prototype and exploring how the magnet would be affixed to a variety of mobility vehicles.

Another route that might work but requires a power source is bump or plate gate with a catch and a metal detector that triggers a solenoid that in turn opens the catch.





2.3. Push through the gate that also prevents motorcyclists

It is worth noting that some commercially available gate and barrier options, eg A-frame/motorcycle inhibitors[36], are billed as being accessible but often physically prevent large / all-terrain mobility devices from passing through. If a gate or barrier could be designed that allows easy access by mobility devices but prevents motorcycles it would be widely appreciated. Again we look first at differentiators:

- *Two dimensional front-profile:* This is essentially the principle that the A-frame / motorcycle inhibitors use. The question is whether there is a usable difference in the 2D front profiles of the set of motorcycles compared to the set of mobility aids. If such a difference exists it could be used to revise the A-frame design to one which is fit for purpose. This requires some primary research looking at the envelope of profiles.
- *Two (rear) wheels across an axle:* This is a clear differentiator between just about all mobility devices and just about all motorcycles. The challenge is how to turn this into a physical principle that can unlock or unlatch a gate.
- *Lateral asymmetric weight distribution:* Building on the above, mobility devices tend to have their weight evenly distributed across the axle. However to go through the gate it is likely that a motorcycle rider may put a foot down on the ground. This foot would carry less weight than the motorcycle itself. Again the challenge is how to turn this into a physical principle that can unlatch or unlock a gate.
- *3D and side 2D profiles:* These are clear differentiators but it is not clear that there is an easy physical principle to distinguish between motorcycles and mobility aids, and then convert that into a physical method of unlocking or unlatching a gate. However a simple lo-res video camera should be able to tell the difference and this methodology is discussed below (cf 2.5)

These concepts are currently being investigated by a team of five Masters degree Mechanical Engineering students at Southampton University, as part of their group design project.

36 https://centrewire.com/products/motorbike-inhibitor/

2.4. RFID/Bluetooth and fob/card

An RFID or Bluetooth detector could detect the approach of a disabled person on an ability aid if they are carrying a suitable fob or card, or have one attached to their mobility device. Once triggered this can in turn trigger a solenoid that releases a catch as above, or opens a latch or a bolt directly (as for example the bump gates with a solenoid 2.1). Of course this method requires some kind of power source, that could be generated by a small wind turbine and/or solar panel, or other system that captures the energy inherent in opening and closing the gate.

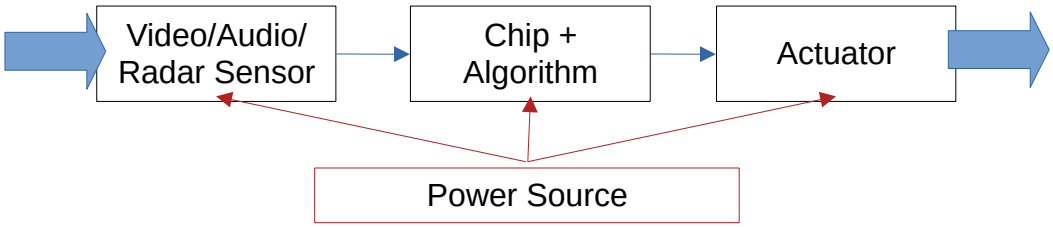
Signal from fob/card→RFID/Bluetooth→Solenoid operated catch

One way to achieve this would be to add the above to one of the existing Radar key operated kissing gates[14]. The fob and solenoid would replace the Radar key lock that is inaccessible for many disabled people. This would also exclude motorcycles.

Prototypes of this kind are being developed for urban transport, e.g. the Hands Free Accessible Fare Gate in Boston, Massachusetts[37].

2.5. Audio/video/radar object recognition

This would operate by automatically recognising that the user is on a mobility device and unlocking the gate by a solenoid as above, so the user can drive through pushing it open as they go. This would also require a power source, However it's a bit neater than the solution above as there is no requirement for the user to have a fob or card.

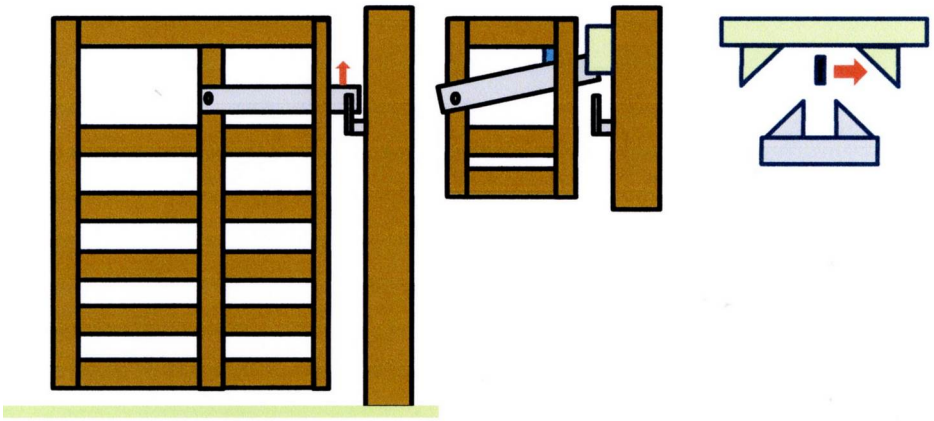


37 https://archive.org/details/06-08-22-hands-free-fare-gates/page/n7/mode/2up

3. One-Handed operation

The essence of this approach is to design a gate or latch that a user can open using one hand. Once it is open it stays open so the user can relax, and then use the same hand to drive through the gate. There are many kinds of disability for whom using both hands is impossible, and for many if not most disabled people it is always awkward. Some of the ideas are described here. Please note that they're not all complete solutions and that a number of partial solutions that have been developed elsewhere would be useful to make this work as a complete system.

3.1. Magnetic through latch



The simplest form of gate latch is the "through latch" as illustrated below. The latch is lifted, by whatever means, to catch on the magnet (blue). As the gate opens the latch (black) in the third diagram hits the shaped plate above it on the gate post (green) and is forced downwards, releasing itself from the magnet. The magnet must be located at sufficient height that the latch does not jump high enough to reach the magnet when the gate closes.

3.2. Test rig and general problems with magnets

A full-size rig has been constructed to test possible latch release mechanisms in the workshop.

A wooden frame holds a section of a gate post with an Easylatch mounted on it. The upper and lower sections of the frame serve as guide rails for a 70mm wide post representing the end face of a gate, on which a gate bolt is mounted at the level of the Easylatch latches. This post is moved past the gatepost at a fixed distance to mimic the motion of the gate in the field.

Tests on this rig, using a simple magnetic catch for a kitchen cupboard, as in the photo, held the latches on the Easylatch open, proving the principle. However, magnets are susceptible to physical damage and deterioration with temperature, so specialist assistance on the choice of magnets for the applications described below is being sought from Eclipse Magnetics [38]

38 https://www.eclipsemagnetics.com/uk-magnets/

Pins on the gate were used to release the pawls, but tests showed that the challenge is to delay the release until the gate bolt is past the corner of the latch falling into the locked position ("the critical point"). The design of the standard Easylatch makes the positioning of these pins difficult. When the centre of the gate reached the centre line of the latch on closing, the outer edges of the 70mm gate were at the same position as the round tops of the pawls, so there was virtually no tolerance. Longer pawls would mean that they protruded beyond the frame – which may be allowable – but a less invasive solution is sought.

3.3. Pendulum

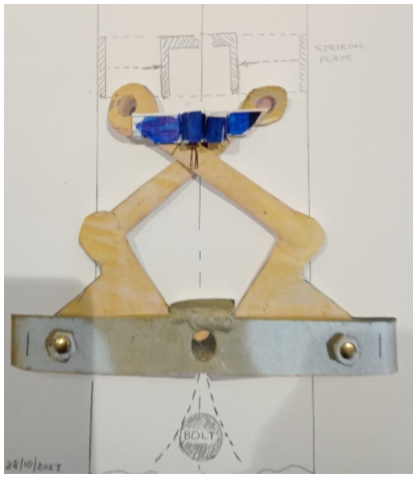
To delay the release of a pawl from the magnet, the magnet is mounted on a pendulum pivoted on the gate. As the gate opens, the magnet is initially held in position by the pawl. As the angle of the pendant increases, so does the load on the magnet, eventually releasing it beyond the critical point. This idea has not yet been tested on the rig, but suggestions for improvement include a double pendulum to further delay the separation.

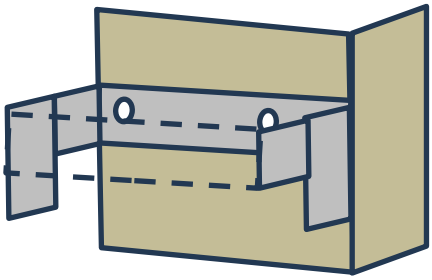
Clearly, further development and prototyping is needed to decide on the optimum geometry of the system.

FIGURE 1. View from the scooter. The gate is to move away from the scooter, so latch A would be raised by using a stick (at present), to lock it onto the pivot magnet (see figure 2). The person can now stow the stick and move the scooter to go through the gate. As the gate moves, the pivot pulls the magnet off the trapped latch, which falls back into place.
NB. The length of the pendulum must be decided by trial and error to ensure that the gate bolt clears latch A. It may also be better to pivot the magnet on the pivot plate to give a straight pull from the latch, rather than a "peeling" action.

3.4. Magnet on Easylatch pawls

This idea has not been tested on the rig. In this concept the magnet is fixed to one of the Easylatch pawls and a plate on the other. They are both lifted together and, when the latches are flush with the Easylatch frame, the magnet (blue) latches to the plate (also blue) to lock the pawls, thereby releasing the gate in either direction. As both pawls must be raised together, a problem like that in 3.2 is raised, as the magnetic bond would be broken too soon to release the gate beyond the critical point if pins were fixed to it to strike either pawl. A contoured "striking plate" on the gate is suggested, as illustrated, that misses the nearest pawl but strikes the other after the critical point has been passed in either direction. The dotted lines represent the front of the plate, which would have holes to facilitate fixing to the gate and all edges and corners rounded.



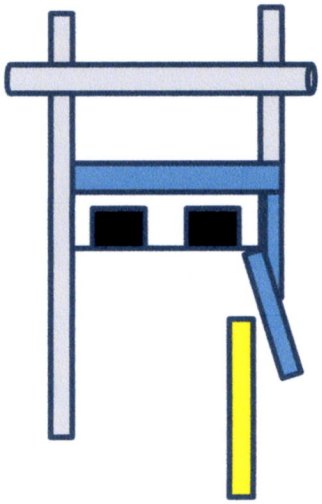


3.5. Release frame above the easy-latch

The principle of using a magnet to capture the pawl of a Centrewire easy latch and a release lever mounted on an inverted easy latch frame above, has been developed to yield the layouts pictured. The magnet used had two lengths of magnetic material mounted parallel to the longitudinal axis in the white plastic body, with a central screw attachment.

In each case a pin on the gate engages with the curved upper surface of the release lever as the gate opens, which pushes the pawl off the magnet. All worked well on the test rig and are worthy of taking to the prototype stage.

The magnet mounted on the underside of the upper frame (using gaffer tape for the development) would be the simplest to make, but contact between the curved surface of the pawl and the magnet may be less than the other arrangements. The other systems, using the magnets in a "V" shape to capture both pawls, give better contact with the pawl but limited – though seemingly adequate - contact with the release lever. As the magnets could not be cut, they were turned through 90o to simulate a smaller magnet, thereby increasing the contact area and angle of strike between pawl and release lever. This arrangement also worked well, but had the disadvantage that the magnets protruded from the plane of the frames. Smaller magnets of equal strength are sought.



The greatest problem encountered in all the work to date is the (necessary) loose fitting of the easy latch itself, presumably to avoid corrosion and for ease of manufacture. This allowed the pawl to move outside the upper inverted frame, completely missing the magnet in all configurations. This could be overcome by attaching a guiding frame, (coloured blue in the side-on illustration), for the pawl (yellow). This could also be used to mount the magnet (black & white) on the inverted frame (grey).

If the gate on the test rig was closed very quickly, as though the gate was slammed, the pawl rose more than normal and stuck onto the magnet, leaving the gate open. This occurred in all of the figurations tested. Some form of damper system to control the speed on the last metre or so of the swing could be the simplest solution.

3.6. See-saw and T-bar

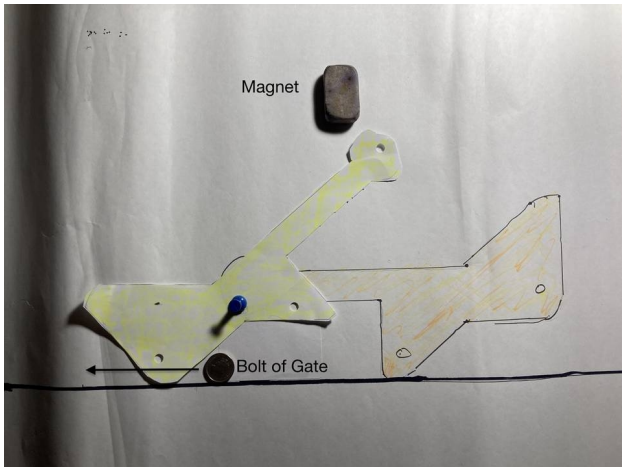
This ingenious device is a type of "through latch" gate (cf 3.1). The latch on this gate is pulled by a handle at a little distance from the gate. This brings the handle pull to the point where it is easily accessible by someone on a mobility device. When the handy lever is pulled it pushes the mechanism up, thereby pushing the latch of the gate up and out of its slot and moves in a direction away from the user. The user can simply drive through. When the gate shuts behind the latch goes back into its slot and pushes the mechanism down. Informal testing indicates that this design is easy to use and leads us to believe it has a lot of potential. As far as we are aware this is a one-off installation and can be found at Broughton Moor Forest, near Coniston: https://w3w.co/rolled.eased.stormed

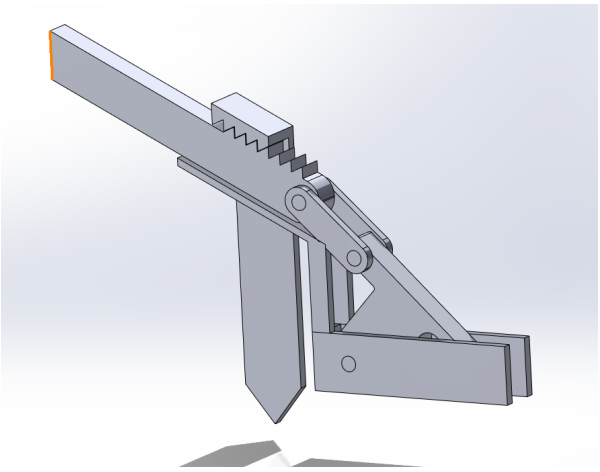
3.7. Double-Catch

The essence of the principle is that when the main latch is opened the second latch comes down. The latch is held in this position by a magnet or a ratchet. When you then push the gate open the bolt on the gate engages with the second latch, kicks it up, releasing the magnet or dis-engaging the ratchet and the latch drops back into place. The design is based heavily on the standard easy latch.

The current design should work but suffers from being bulkier than the easy-latch. The tricky part of the ratchet latch is that when the gate then closes and the bolt slides back past the latch and thus lifts it up again the spacing of the teeth must be so that they **do not** remesh at this point to make sure the gate self closes properly.

With some design refinement these issues can be solved.



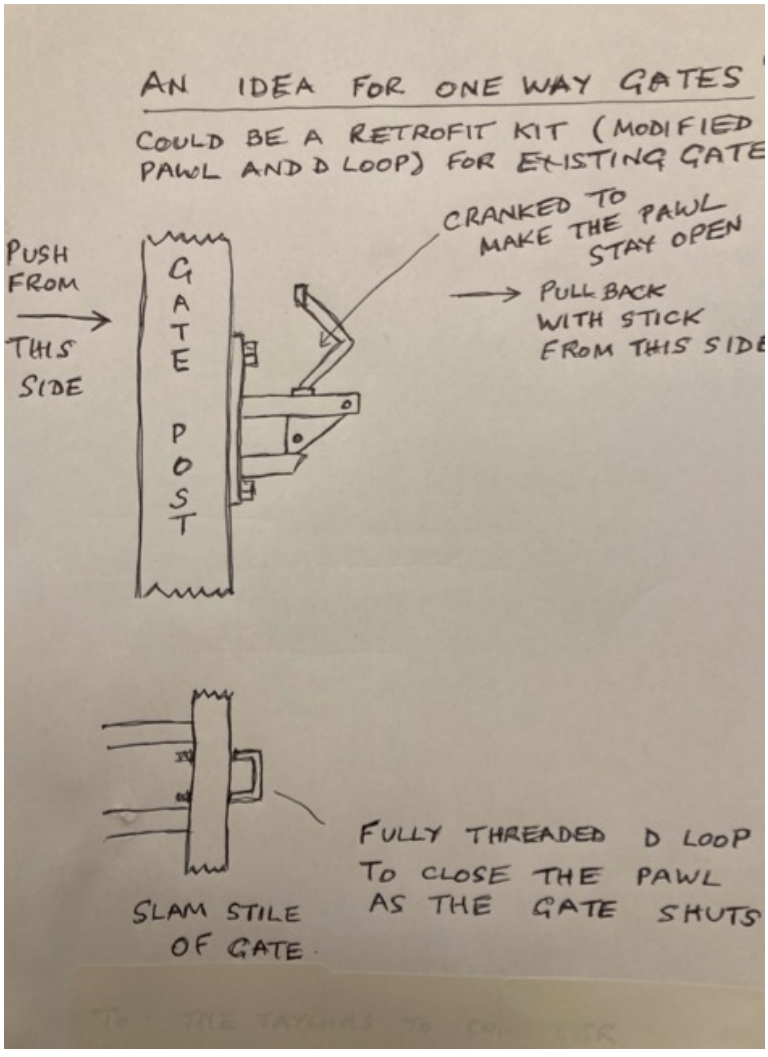


3.8. <u>One-way latch with cranked pawl</u>

There are many thousands of one-way gates installed on the PROW network mostly using a standard self-locking gate catch. The concept is to design two components which could be retrofitted to the standard latch and gate to allow the gate to be opened with one hand.

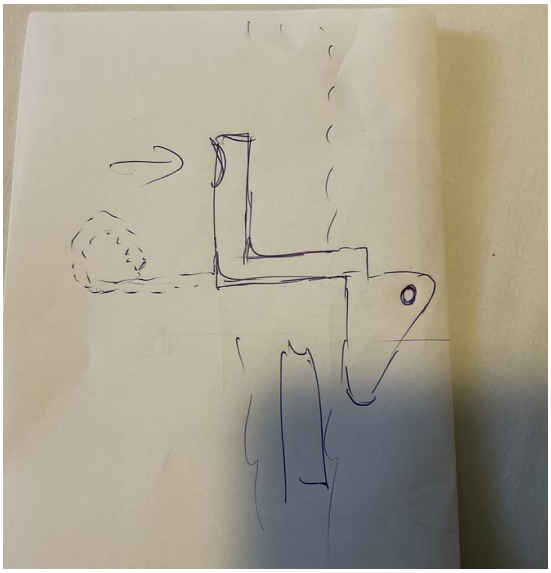
The first component comprises a modified pawl weighted to remain open when pulled or pushed perhaps by using a cranked handle or some other method. The second component is a D loop or something similar that will return the pawl to the closed position when the gate shuts.

Only a working prototype will establish whether there is any potential in this concept. The areas of concern are whether there is enough weight in the pawl in the open position to overcome the motion of the self-closing gate when just opened, whether the D loop can be placed in a position not to foul the pawl but still close it when required, and whether the shape of the modified pawl can be made stock proof. In short, several potential difficulties but significant potential if they can be overcome.



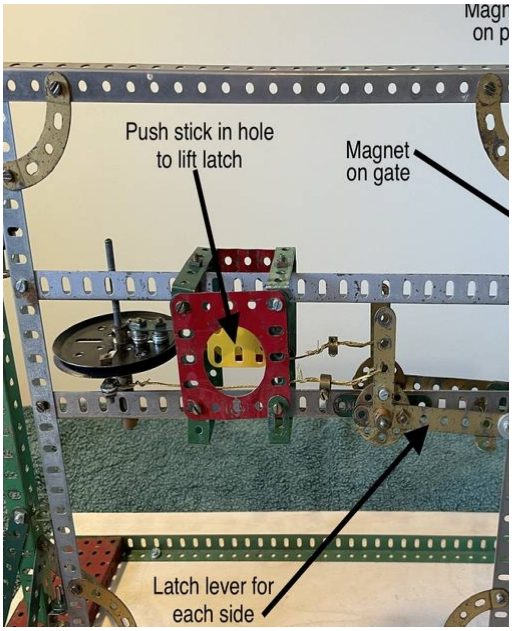
3.9. Extended pawl

Existing pawls are relatively short and can be difficult to get hold of if you're disabled. An extended pawl allows the user a greater area to grab on to.



3.10. Protective shroud

Many of the challenges centre around making gates and barriers inaccessible for livestock and other animals. A shroud or protective cover around a latch, and particularly an extended pawl, would prevent cow's tongues or other animal bits from opening the latching



4. Next Steps

The next steps are to turn a number of the more promising technical routes above into proof of principle but real-world prototypes. Our plan is to have a few of these made by the summer of 2024. It is not clear at this stage which of these technical routes may be the most promising. However only an empirical test of a physical prototype will give a sense of accessibility. Even then it may be necessary, indeed even likely, that we have to go back to the drawing board and come up with revised ideas. Please do get in touch if you would like to know more about this project.

Appendix 1:

List of people who have taken part in at least one workshop or interacted in some way:
Aaron Horsfield
Amal Raj Augustine
Barry Andrews
Debbie North
Gary Cartner
Gordon Guest
James Maybey
Jed Wragg
Jessica Shum
John B Hunt
John Cuthbertson
Lauren Payne
Marian Andrews
Mark Newman
Martin Bedford
Ming Siaw
Paula Brunt
Pete Brunt
Ron Lyon
Shail Patel
Steve Wilson
Tom Bindoff
Val Woods

Appendix 2: Glossary of Terms

Term	Description
Gate Terminology	
Pedestrian Gate	Device hinged at one side installed in a boundary such as a fence, hedge or wall which acts as a barrier to animals and motor vehicles, but which allows the passage of pedestrians and their dogs, and mobility vehicles.
Bridle Gate	Device hinged at one side installed in a boundary such as a fence, hedge or wall which acts as a barrier to animals and motor vehicles, but which allows the passage of horse-riders, riders of cycles, pedestrians and their dogs, and mobility vehicles (Ref: BS5709)
Bridleway	Any route where horses are allowed
Kissing Gate	Device consisting of a hinged gate that is constrained to swing between two posts at the opening of an enclosure forming part of the structure, and which allows the passage of legitimate users, whilst preventing the passage of animals, etc.
Gate Leaf	The main body/frame/Panel of a gate that opens and closes as a single unit.
Gate Rail	A horizontal section of a gate
Gate Stile	A vertical upright section of a gate, normally the outermost uprights.
Hang Stile	The upright section of the gate where the hinges are fixed and where it connects to the post. (End of the gate that pivots)
Slam Stile	The upright section of the gate where the latch is fixed and which latches closed. (End of the gate that swings)
H-Frame	A Metal frame, in a “H” style arrangement with a section/cross member buried in the ground
Slam Post	The post to which a gate closes to, often where the latching interface occurs.
Hang Post	The post to which a gate is hung, where the hinges are situated
Auto Latch	A latching mechanism that automatically latches closed. In Centrewire terms this is a design of latch that is attached to one side of a post.
Easy Latch	A Centrewire automatically closing latch system that is installed in-line with the gate, between the gate and post.
1-Way Catch	A latching system that allows the gate to be opened only one way in a gap. A 1-way Easy latch simply has one of the pawls removed.
2-Way Catch	A latching system that allows the gate to be opened both ways in a gap. A 2-way Easy Latch system has two Pawls operating in opposing directions.
Pawl (or Latch Pawl)	The pawl is the levering section of the latch that once down restrains the movement of the bolt. (The yellow component that is moved by the user in an easy latch)
Shoot Bolt/Spring Bolt	A moveable bolt, normally attached to the gate, to which the latch restrains or which extends into a profile, to prevent the gate being opened . Following the release of BS 5709:2018, these are usually found in a “D-loop” arrangement to reduce risk of catching or harm as users pass through the gate.
Offset Hinge set	Otherwise known as the self-closing hinge set. This only uses the force of gravity to self close, with no hydraulics involved.
Straight Handle	A standard, straight handle supplied with Centrewire gates, protruding a certain height above the top of the gate to allow access to horse riders.

Trombone Handle	A handle that curves over the top of the gate, allowing easy operation
Stock-Proof Handle	A handle whose operation is intended to prevent the passage of farmed animals.
Top Rail Guide Plate	The plate attached to the top rail of a gate, through which the handle passes. Helps to guide and support the handle through its range of motion.
RADAR lock	Lock operated by a key (RADAR Key), normally only available to disabled people
Gate Striker/Cranked Striker	A non-moving length of metal, normally attached to the gate, to which the latch restrains, to prevent the gate being opened. Following the release of BS 5709:2018, these are usually found in a “D-loop” arrangement to reduce risk of catching or harm as users pass through the gate.
Gate Stop	A protrusion on Centrewire gates to convert a gate to be only 1-way. It closes onto the post, normally with a rubber dampener preventing the gate going through (used in conjunction with a 1-way Easy latch)
Hinge Hook	A simple pin on a piece of plate that provides the male portion of a hinge on a post for an eyebolt on a gate assembly to mount to.
Hook to Drive	A hinge hook attached to a sharpened pin to be driven into a wooden post
Hook to Bolt	A hinge hook with a threaded section of rod attached, to allow it to be mounted through a hole in a post and fixed in place with a nut.
Hook to Plate	A hinge hook with a plate with multiple holes for bolts to pass through
Double Strap Bands	A piece of plate, that mounts either side of and can be bolted to a wooden gate, which is formed to provide the female profile of a hinge on its end, to mount to a hinge hook.
Dog Gate	Device allowing the passage of a dog, whilst preventing the passage of other animals
Enclosure	Area within which the gate of a kissing gate swings or the area between a part of gates comprising one structure
Gap	Unimpeded way through a boundary together with any side structure
Self-closing gate	Gate which returns without intervention to a position touching, or in line with, the closing post
Horse Stile	Non-moving structure designed to allow horses to pass whilst forming a deterrent to motorcycles
Stepover	Rail in a horse stile, on the ground surface, which horses need to step over
Step-through gate	Openable barrier allowing horses to step through when closed. (Also known as a horse-friendly barrier
Pedestrian/Access Stile	Fixed device allowing the passage of pedestrians over or through a fence, wall or hedge, while forming a barrier to farmed animals and many dogs, as well as cycles and mobility vehicles.
General Manufacturing Terminology	
SHS	Square Hollow Section Tube
RHS	Rectangular Hollow Section Tube
CHS	Circular Hollow Section Tube
Galv Venting/Notching	Holes or profiles added to a structure or section of tube, to prevent air traps which could be dangerous when dipped in a galvanising bath.
Tube Saddling	The profiling of the end of a tube where it meets another tube.